Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

Application of	)	
SPACE EXPLORATION HOLDINGS, LLC	)	Call Signs: S2983 and S3018
For Modification of Authorization for the SpaceX NGSO Satellite System	)	File No. SAT-MOD-20200417-00037

The BALANCE GROUP Reply to Response of SpaceX

This filing is a Reply to the June 8, 2020, Response of SpaceX Holdings in the above-captioned proceeding.[1] On May 26, 2020, The BALANCE GROUP filed its *Opposition.*[2]

Overall, the SpaceX Response, like in its Major Modification application, presents of *prima facie* case of misunderstanding the facts, misstating the facts, not comprehending the proceedings at issue, and most importantly, showing that they are presently incapable of showing the FCC or the public that they have a reasonably well-formed, let alone safe, modification plan in compliance with 47 CFR, Part 1 & Part 25.

[1] *See* Response of SpaceX Holding, LLC to The BALANCE GROUP Opposition to SpaceX Application for Major Modification; and Motion for Consultation with Affected Agencies; Motion for Disclosure; Motion for Certification of Suitably Comprehensive Insurance Coverage; Motion for Certification of Indemnity and Motion to Suspend or Revoke Licenses, IBFS File No. SAT-MOD-20200417-00037 (June 8, 2020) ("SpaceX Response").

[2] *See* Opposition to SpaceX Application for Major Modification; and Motion for Consultation with Affected Agencies; Motion for Disclosure; Motion for Certification of Suitably Comprehensive Insurance Coverage; Motion for Certification of Indemnity and Motion to Suspend or Revoke Licenses by The Balance Group, IBFS File No. SAT-MOD-20200417-00037 (May 26, 2020) ("Opposition").

I. BACKGROUND:

At pages 2-3 in the SpaceX Response, it states:

> "Balance [Group] implies that SpaceX for failed to provide, and the Commission failed to consider, information relating to a wide range of issues purportedly implicated by the proposed modification. The areas noted include a varied list of topics, including:
> (1) whether the Commission reviews elements of the National Environmental Protection Act ("NEPA"), including assessments of the impact on humans, flora, and fauna;
> (2) whether the Commission firmly established its space debris rules and had them reviewed by all major players;
> (3) the Commission's apparent failure to require "any mention of whether [SpaceX] secured any insurance against multiple forms of catastrophic failure";
> (4) the Commission's failure to require peer-reviewed studies and input from other federal agencies with expertise on the impact of radio frequency ("RF") exposure resulting from the proposed modification;
> and
> (5) the Commission's failure to require peer reviewed studies of the impact on radio astronomy.
>
> Yet as discussed below, the Commission has fully considered each of these issues and resolved them, often in a way that obviates the need for individual satellite operators like SpaceX to provide further information in their applications."

SpaceX also states that:

> "The Opposition also refers to a series of "motions" but does not support each of those requests individually or cite any rule or other authority under which those requests are made. Therefore, in addition to the flaws in its underlying reasoning discussed herein, this is another basis for denying the "motions.""

As a general matter, SpaceX mischaracterized The BALANCE GROUP's main arguments. That is possibly caused because SpaceX, in most cases, did not understand or accurately quote the arguments. Worse, SpaceX mis-addresses or simply ignores the material points necessary to assess the suitability of their proposed Major Modification.

The main arguments, as summarized in the Opposition (and that were ignored and mis-characterized in the SpaceX Response) are provided below, verbatim. Then the reasons why it is

impermissible to ignore those arguments are repeated and amplified with additional specifics, including and not limited to their relation to Part 25, 47 CFR, and the major modification process.

Verbatim Conclusion Paragraphs from The BALANCE GROUP Opposition and Motion for Consultation with Affected Agencies; Motion for Disclosure; Motion for Certification of Suitably Comprehensive Insurance Coverage; Motion for Certification of Indemnity and Motion to Suspend or Revoke Licenses:[3]

> "As amply demonstrated herein, the SpaceX application for modification represents a massive redesign and must be denied and is evidence that the "ready, fire, aim" approach is not wise, especially when planning the largest network in human history. There is a dire need for numerous expert U.S. agencies, and in many cases, their international counterparts, to assess the world's largest ever attempted satellite network as licensed, let alone as proposed for modification. Therefore, the Motion for Consultation with Affected Agencies must be granted. A list of agencies suggested for consultation is provided as ATTACHMENT A.
>
> "Many SpaceX documents regarding the status of its design assessments, the nature of its insurability and other critical matters remain hidden from view. The public interest requires that those documents be provided on the record, and thus the Motion for Disclosure of those documents and studies as described herein must be granted, including and not limited to: (1) information from potential insurers and indemnifiers as to the scope and concerns about providing suitably broad protections to match the historic size, scope and duration of the network as proposed for modification, (2) statements about why the design continues to be so wildly fluid, (3) whether the satellites as designed have ever been tested in the real-world to entirely burn upon re-entry into the atmosphere, (4) environmental impact assessments concerning and not limited to chemical and metals and persistent liquids pollution, and radio frequency hazards to humans and flora and fauna, and night sky pollution.
>
> "As SpaceX's own documents and modification amendment admit, SpaceX has dramatically swung its design as originally licensed from five (5) orbital elevation locations now to a proposal to radically drop one hundred percent of the 4,409 satellites authorized under call signs S2983/S3018 down to nearly 540-570 km, yet they provide no NEPA review, no proof that there will be no systemic harm to a baffling array of national security, business and human and environmental health sectors, no proof of insurance against systemic failure, no proof of sufficient indemnity, no proof that the systems will operate as advertised and provide a stunning lack of peer-reviewed studies or coordination with over a dozen heavily-impacted federal agencies. Therefore, the Motion to Suspend Additional Launches or Alternatively Revoke Licenses until and if baseline safety and licensure and operational conditions are met, must be granted.

[3] Ibid at pp. 23-24

> "The SpaceX network, as approved and as planned and as proposed for modification, will be the largest in the earth's history, dwarfing all currently operating systems combined as measured by publicly available records. As such, the regulatory agencies overseeing the potential impacts of approving the deployment, hold a heightened duty of care and persistent vigilance. The questions listed herein, and the cited apparent omissions in the SpaceX Major Modification Application and the associated SpaceX materials in the record, are meant to be useful to the FCC, SpaceX, the public and the public's representatives in assessing material issues related to approving, funding, constructing, and safely operating the proposed network, or similar networks."

BALANCE GROUP incorporated by reference in its Opposition to the Major Modification a prior and related Application for Review (AFR), and Petitioners' Reply to Opposition of Space Services, Inc. to Application for Review[4]. These incorporated filing cited a plethora of rules, beginning with the specific requirement for SpaceX to produce a credible Radiation Hazard Report (RHR). The AFR is explicitly incorporated by reference along with all its citations and attached Declarations in the present Opposition.

II. SPECIFIC REPLIES TO ARGUMENTS RAISED IN THE SPACEX RESPONSE

1. SpaceX Reply pg. 1: "But it nonetheless opposes SpaceX's proposed modification without citing a single Commission policy or rule that is inconsistent with the modification SpaceX proposes. Instead, it raises a plethora of loosely related concerns…"

BG Response: Not true. BALANCE GROUP clearly referenced 47 CFR, Parts 1 & 25,[5] and "requirements on the face of the license."[6] To be clear and to state the obvious, the requirements

[4] See Opposition at pp 6-7, and also footnotes 12 and 13. See also, Application for Review filed April 15, 2020, In the Matter of SpaceX Services Corporation, File Number: SES-LIC-20190211-00151, Blanket License Granted to SpaceX Services Corporation on March 13, 2020 by the International Bureau, Satellite Division hereby incorporated in full by reference, and also, Petitioners' Reply filed May 15, 2020, to Opposition of SpaceX Services, Inc. To Application For Review, hereby incorporated in full by reference

[5] Opposition at p. 3.

[6] Opposition at p. 4. See also, Opposition at fn. 2, where BALANCE GROUP cites to: (i) Call Sign S2983/S3018, which is the subject of the instant Major Modification, and (ii) Call Sign S2992, which is the subject of 7,518

cited in the 47 CFR and on the "face of the license" and on inextricably intertwined inter-agency requirements, include, and are not limited to:

§ 25.102 Station authorization required.

(a) No person shall use or operate apparatus for the transmission of energy or communications or signals by space or earth stations except under, and in accordance with, an appropriate authorization granted by the Federal Communications Commission.

(b) Protection from impermissible levels of interference to the reception of signals by earth stations in the Fixed-Satellite Service from terrestrial stations in a co-equally shared band is provided through the authorizations granted under this part.[7]

Issue: SpaceX has not met its 25.102 requirements as explained in extensive detail in the Opposition and the related AFR proceedings to show that it is going to be able to refrain from impermissible operations, as proposed in the Major Modification. This includes, and is not limited to, impermissible "transmission of energy or communications or signals by space or earth stations." This is especially due to the utter lack of reasonably documented compliance with basic requirements, such as a report on whether SpaceX is even insured against or provided a guarantee against impermissible levels of interference, catastrophic or systemic failure, or whether SpaceX has conducted necessary reviews for its seemingly limitless supply of wildly changing network configurations and modification requests.

§ 25.114 Applications for space station authorizations.

(a)

(1) A license application filed pursuant to § 25.110(b)(2) for a GSO space station or NGSO space station or space-station constellation must comprise a

additional satellites that are inextricably intertwined with the SpaceX master plan, including and not limited to, the matters subject to this Major Modification request.

[7] **56 FR 24016, May 28, 1991**

comprehensive proposal and must be submitted on FCC Form 312, Main Form and Schedule S, with attached exhibits required by paragraph (d) of this section.

(2) An application for blanket authority for an NGSO constellation of space stations that are not all technically identical must provide the information required by paragraphs (c) and (d) of this section for each type of station in the constellation.

(3) For an application filed pursuant to the two-step procedure in § 25.110(b)(3), the filing pursuant to § 25.110(b)(3)(iii) must be submitted on FCC Form 312, Main Form and Schedule S, with attached exhibits as required by paragraph (d) of this section, and must constitute a comprehensive proposal.

(b) Each application for a new or modified space station authorization must contain the formal waiver required by 47 U.S.C. 304.

(c) The following information shall be filed on FCC Form 312, Main Form and Schedule S:

(1) Name, address, and telephone number of the applicant;

(2) Name, address, and telephone number of the person(s), including counsel, to whom inquiries or correspondence should be directed;

(3) Type of authorization requested (*e.g.*, launch authority, station license, modification of authorization);

(4)

(i) For each space station transmitting and receiving antenna beam (including telemetry and tracking beams but not command beams), specify channel center frequencies and bandwidths and polarization plan. For command beams, specify each of the center frequencies within a 5 MHz range or a range of 2 percent of the assigned bandwidth, whichever is smaller, and the polarization plan. If the space station can vary channel bandwidth in a particular frequency band with on-board processing, specify only the range of frequencies in that band over which the beam can operate and the polarization plan.

(ii) Specify maximum EIRP and maximum EIRP density for each space station transmitting antenna beam. If the satellite uses shapeable antenna beams, as defined in § 25.103, specify instead maximum possible EIRP and maximum possible EIRP density within each shapeable beam's proposed coverage area. Provide this information for each frequency band in which the transmitting antenna would operate. For bands below 15 GHz, specify EIRP density in dBW/4 kHz; for bands at and above 15 GHz, specify EIRP density in dBW/MHz. If the EIRP density varies over time, specify the maximum possible EIRP density.

(iii)-(iv) [Reserved]

(v) For each space station receiving beam other than command beams, specify the gain-to-temperature ratio at beam peak. For receiving beams fed into transponders, also specify the minimum and maximum saturation flux density at beam peak. If the satellite uses shapeable beams, specify the minimum and maximum gain-to-temperature ratio within each shapeable beam's proposed coverage area, and for shapeable receiving beams fed into transponders, specify the minimum and maximum saturation power flux density within the 0 dB relative antenna gain isoline. Provide this information for each frequency band in which the receiving

beam can operate. For command beams, specify the beam peak flux density at the command threshold;

(vi)

(A) For space stations in geostationary orbit, specify predicted space station antenna gain contour(s) for each transmit and receive antenna beam, except for beams where the contour at 8 dB below peak falls entirely beyond the edge of the visible Earth. These contour(s) should be plotted on an area map at 2 dB intervals down to 10 dB below the peak gain and at 5 dB intervals between 10 dB and 20 dB below the peak gain. Applicants must present this information in a GIMS-readable format.

(B) For space stations in non-geostationary orbits, specify for each unique orbital plane the predicted antenna gain contour(s) for each transmit and receive antenna beam for one space station if all space stations are identical in the constellation. If individual space stations in the constellation have different antenna beam configurations, specify the predicted antenna gain contours for each transmit and receive beam for each space station type and orbit or orbital plane requested. The contours should be plotted on an area map with the beam depicted on the surface of the earth with the space stations' peak antenna gain pointed at nadir to a latitude and longitude within the proposed service area. The contour(s) should be plotted at 2 dB intervals down to 10 dB below the peak gain and at 5 dB intervals between 10 dB and 20 dB below the peak gain. For intersatellite links, specify the peak antenna gain and 3 dB beamwidth.

(C) For space stations with shapeable antenna beams, specify the contours, as defined in paragraph (c)(4)(vi)(A) or (B) of this section, for the transmitting beam configuration that results in the highest EIRP density for the beams listed in paragraph (c)(4)(ii) of this section and for the receiving beam configuration with the smallest gain-to-temperature ratio and the highest required saturation power flux density for the beams listed in paragraph (c)(4)(v) of this section. If the shapeable beams are also steerable, include the contours that would result from moving the beam peak around the limit of the effective beam peak area and the 0 dB relative antenna gain isoline. The proposed maximum coverage area must be clearly specified.

(D) For a space station with steerable beams that are not shapeable, specify the applicable contours, as defined in paragraph (c)(4)(vi)(A) or (c)(4)(vi)(B) of this section, with a description of a proposed coverage area for each steerable beam or provide the contour information described in paragraph (c)(4)(vi)(C) of this section for each steerable beam.

(vii) For geostationary satellites with large numbers of identical fixed spot beams, other than DBS satellites, applicants may, as an alternative to submitting the information described in paragraph (c)(4)(vi) of this section with respect to these beams, provide the predicted antenna gain contours for one transmit and receive antenna beam, together with one of the following:

(A) An area map showing all of the spot beams depicted on the surface of the Earth;

(B) A table identifying the maximum antenna gain point(s) in latitude and longitude to the nearest 0.1 degree; or

(C) A map of the isolines formed by combining all of the spot beams into one or

more composite beams. For non-geostationary satellites with large numbers of identical fixed beams on each satellite, applicants may, as an alternative to submitting the information described in paragraph (c)(4)(vi) of this section with respect to those beams, specify the predicted antenna gain contours for one transmit and receive beam pointed to nadir, together with an area map showing all of the spot beams depicted on the surface of the earth with the satellites' peak antenna gain pointed to a selected latitude and longitude within the service area.

(5) For space stations in geostationary orbit:

(i) Orbital location requested,

(ii) [Reserved]

(iii) East-west station-keeping range,

(iv) North-south station-keeping range, and

(v) Accuracy to which antenna axis attitude will be maintained;

(6) For space stations in non-geostationary orbits:

(i) The number of orbital planes and the number of space stations in each plane,

(ii) The inclination of the orbital plane(s),

(iii) The orbital period,

(iv) The apogee,

(v) The perigee,

(vi) The argument(s) of perigee,

(vii) Active service arc(s),

(viii) Right ascension of the ascending node(s), and

(ix) For each satellite in each orbital plane, the initial phase angle at the reference time;

(7) The frequency bands, types of service, and coverage areas;

(8) Calculated maximum power flux-density levels within each coverage area and energy dispersal bandwidths, if any, needed for compliance with § 25.208, for the angles of arrival specified in the applicable paragraph(s) of § 25.208, except for an NGSO FSS applicant certifying compliance with PFD limits under § 25.146(a)(1);

(9) [Reserved]

(10) Estimated operational lifetime;

(11) Whether the space station is to be operated on a common carrier basis;

(12) [Reserved]

(13) And the polarization information necessary to determine compliance with § 25.210(i).

(d) The following information in narrative form shall be contained in each application:

(1) Overall description of system facilities, operations and services and explanation of how uplink frequency bands would be connected to downlink frequency bands;

(2)-(5) [Reserved]

(6) Public interest considerations in support of grant;

(7) Applicants for authorizations for space stations in the Fixed-Satellite Service, including applicants proposing feeder links for space stations operating in the 17/24 GHz Broadcasting-Satellite Service, must also include the information specified in § 25.140(a). Applicants for authorizations for space stations in the 17/24 GHz Broadcasting-Satellite Service must also include the information specified in § 25.140(b);

(8) Applications for authorizations in the Mobile-Satellite Service in the 1545-1559/1646.5-1660.5 MHz frequency bands shall also provide all information necessary to comply with the policies and procedures set forth in Rules and Policies Pertaining to the Use of Radio Frequencies in a Land Mobile Satellite Service, 2 FCC Rcd 485 (1987) (Available at address in § 0.445 of this chapter.);

(9) Applications to license multiple space station systems in the non-voice, non-geostationary mobile-satellite service under blanket operating authority shall also provide all information specified in § 25.142; and

(10) An application for space station authorization in the 1.6/2.4 GHz or 2 GHz Mobile-Satellite Service must include information required by § 25.143(b);

(11) Applications for space stations in the Direct Broadcast Satellite Service must include a clear and detailed statement of whether the space station is to be operated on a broadcast or non-broadcast basis;

(12) The information required by § 25.146, if the application is for an NGSO FSS system authorization within the 10.7-30 GHz band.

(13) For satellite applications in the Direct Broadcast Satellite Service, if the proposed system's technical characteristics differ from those specified in the Appendix 30 BSS Plans, the Appendix 30A feeder link Plans, Annex 5 to Appendix 30 or Annex 3 to Appendix 30A of the ITU Radio Regulations, each applicant must provide:

(i) The information requested in Appendix 4 of the ITU Radio Regulations. Further, applicants must provide sufficient technical showing that the proposed system could operate satisfactorily if all assignments in the BSS and feeder link Plans were implemented.

(ii) Analyses of the proposed system with respect to the limits in Annex 1 to Appendices 30 and 30A of the ITU Radio Regulations.

(14) A description of the design and operational strategies that will be used to mitigate orbital debris, including the following information:

(i) A statement that the space station operator has assessed and limited the amount of debris released in a planned manner during normal operations, and has assessed and limited the probability of the space station becoming a source of debris by collisions with small debris or meteoroids that could cause loss of control and prevent post-mission disposal;

(ii) A statement that the space station operator has assessed and limited the probability of accidental explosions during and after completion of mission operations. This statement must include a demonstration that debris generation will

not result from the conversion of energy sources on board the spacecraft into energy that fragments the spacecraft. Energy sources include chemical, pressure, and kinetic energy. This demonstration should address whether stored energy will be removed at the spacecraft's end of life, by depleting residual fuel and leaving all fuel line valves open, venting any pressurized system, leaving all batteries in a permanent discharge state, and removing any remaining source of stored energy, or through other equivalent procedures specifically disclosed in the application;

(iii) A statement that the space station operator has assessed and limited the probability of the space station becoming a source of debris by collisions with large debris or other operational space stations. Where a space station will be launched into a low-Earth orbit that is identical, or very similar, to an orbit used by other space stations, the statement must include an analysis of the potential risk of collision and a description of what measures the space station operator plans to take to avoid in-orbit collisions. If the space station operator is relying on coordination with another system, the statement must indicate what steps have been taken to contact, and ascertain the likelihood of successful coordination of physical operations with, the other system. The statement must disclose the accuracy - if any - with which orbital parameters of non-geostationary satellite orbit space stations will be maintained, including apogee, perigee, inclination, and the right ascension of the ascending node(s). In the event that a system is not able to maintain orbital tolerances, *i.e.*, it lacks a propulsion system for orbital maintenance, that fact should be included in the debris mitigation disclosure. Such systems must also indicate the anticipated evolution over time of the orbit of the proposed satellite or satellites. Where a space station requests the assignment of a geostationary-Earth orbit location, it must assess whether there are any known satellites located at, or reasonably expected to be located at, the requested orbital location, or assigned in the vicinity of that location, such that the station keeping volumes of the respective satellites might overlap. If so, the statement must include a statement as to the identities of those parties and the measures that will be taken to prevent collisions;

(iv) A statement detailing the post-mission disposal plans for the space station at end of life, including the quantity of fuel - if any - that will be reserved for post-mission disposal maneuvers. For geostationary-Earth orbit space stations, the statement must disclose the altitude selected for a post-mission disposal orbit and the calculations that are used in deriving the disposal altitude. The statement must also include a casualty risk assessment if planned post-mission disposal involves atmospheric re-entry of the space station. In general, an assessment should include an estimate as to whether portions of the spacecraft will survive re-entry and reach the surface of the Earth, as well as an estimate of the resulting probability of human casualty. Applicants for space stations to be used only for commercial remote sensing may, in lieu of submitting detailed post-mission disposal plans to the Commission, certify that they have submitted such plans to the National Oceanic and Atmospheric Administration for review.

(v) For non-U.S.-licensed space stations, the requirement to describe the design and operational strategies to minimize orbital debris risk can be satisfied by demonstrating that debris mitigation plans for the space station(s) for which U.S. market access is requested are subject to direct and effective regulatory oversight by the national licensing authority.

(15) Each applicant for a space station license in the 17/24 GHz broadcasting-satellite service shall include the following information as an attachment to its application:

(i) If the applicant proposes to operate in the 17.3-17.7 GHz frequency band, a demonstration that the proposed space station will comply with the power flux density limits in § 25.208(w) unless the applicant provides a certification under paragraph (d)(15)(ii) of this section.

(ii) In cases where the proposed space station will not comply with the power flux density limits set forth in § 25.208(w) of this part, the applicant will be required to provide a certification that all potentially affected parties acknowledge and do not object to the use of the applicant's higher power flux densities. The affected parties with whom the applicant must coordinate are those GSO 17/24 GHz BSS satellite networks located up to ±6° away for excesses of up to 3 dB above the power flux-density levels specified in § 25.208(w) of this part, and up to ±10° away greater for excesses greater than 3 dB above those levels.

(iii) If the applicant proposes to provide international service in the 17.7-17.8 GHz frequency band, a certification that the proposed space station will comply with the power flux density limits in § 25.208(c).

(iv) Any information required by § 25.264(a)(6), 25.264(b)(4), or 25.264(d).

(16) In addition to the requirements of paragraph (d)(15) of this section, each applicant for a license to operate a 17/24 GHz BSS space station that will be used to provide video programming directly to consumers in the United States, that will not meet the requirements of § 25.225 of this part, must include as an attachment to its application a technical analysis demonstrating that providing video programming service to consumers in Alaska and Hawaii that is comparable to the video programming service provided to consumers in the 48 contiguous United States (CONUS) is not feasible as a technical matter or that, while technically feasible, such service would require so many compromises in satellite design and operation as to make it economically unreasonable.

(17) [Reserved]

(18) For space stations in the Direct Broadcast Satellite service or the 17/24 GHz broadcasting-satellite service, maximum orbital eccentricity.

[68 FR 63997, Nov. 12, 2003, as amended at 69 FR 29901, May 26, 2004; 69 FR 47794, Aug. 6, 2004; 69 FR 54587, Sept. 9, 2004; 72 FR 50027, Aug. 29, 2007; 72 FR 60278, Oct. 24, 2007; 76 FR 50431, Aug. 15, 2011; 78 FR 8421, Feb. 6, 2013; 79 FR 8314, Feb. 12, 2014; 81 FR 55326, Aug. 18, 2016; 82 FR 59984, Dec. 18, 2017; 83 FR 34489, July 20, 2018]

Issue: SpaceX has not met its 25.114 requirements as explained in extensive detail in the Opposition and the related AFR proceedings to show that it is going to be able to refrain from impermissible operations, including and not limited to:

(i) collisions, explosions, harmful interference to space-bound and earth-bound systems,

(ii) impermissible radio-frequency levels to humans, flora, fauna and the environment,

(iii) impermissible light-pollution to humans, flora, fauna and the environment.

This is especially concerning due to the utter lack of reasonably documented compliance with basic requirements, such as a report on whether SpaceX is even insured against or provided a guarantee against catastrophic, systemic failure, or whether SpaceX has conducted necessary reviews for its seemingly limitless supply of wildly changing network configurations and modifications**.**

§ 25.117 Modification of station license.

(a) Except as provided for in § 25.118 (Modifications not requiring prior authorization), no modification of a radio station governed by this part which affects the parameters or terms and conditions of the station authorization shall be made except upon application to and grant of such application by the Commission.

(b) Both earth station and space station modification applications must be filed electronically through the International Bureau Filing System (IBFS) in accordance with the applicable provisions of part 1, subpart Y of this chapter.

(c) Applications for modification of earth station authorizations must be submitted on FCC Form 312, Main Form and Schedule B. Applications for modification of space station authorizations must be submitted on FCC Form 312, Main Form and Schedule S. Only those items that change need to be specified, provided that the applicant certifies that the remaining information has not changed.

(d)

(1) Except as set forth in § 25.118(e), applications for modifications of space station authorizations shall be filed in accordance with § 25.114, but only those

items of information listed in § 25.114 that change need to be submitted, provided the applicant certifies that the remaining information has not changed.

(2) Applications for modifications of space station authorizations will be granted except under the following circumstances:

(i) Granting the modification would make the applicant unqualified to operate a space station under the Commission's rules.

(ii) Granting the modification request would not serve the public interest, convenience, and necessity.

(iii) Except as set forth in paragraph (d)(2)(iv) of this section, applications for modifications of GSO-like space station authorizations granted pursuant to the procedure set forth in § 25.158, which seek to relocate a GSO satellite or add a frequency band to the authorization, will be placed in a queue pursuant to § 25.158 and considered only after previously filed space station license applications or space station modification applications have been considered.

(iv) Applications for modifications of space station authorizations to increase the authorized bandwidth will not be considered in cases in which the original space station authorization was granted pursuant to the procedures set forth in § 25.157(e) or § 25.158(c)(4).

(v) Any 17/24 GHz BSS space station operator whose license is conditioned to operate at less than the power level otherwise permitted by § 25.208(c) and/or (w) of this part, and is conditioned to accept interference from a neighboring 17/24 GHz BSS space station, may file a modification application to remove those two conditions in the event that the license for that neighboring space station is cancelled or surrendered. In the event that two or more such modification applications are filed, and those applications are mutually exclusive, the modification applications will be considered on a first-come, first-served basis pursuant to the procedure set forth in § 25.158 of this part.

(3) In the event that a space station licensee provides notification of a planned license modification pursuant to § 25.118(e), and the Commission finds that the proposed modification does not meet the requirements of § 25.118(e), the Commission will issue a public notice announcing that the proposed license modification will be considered pursuant to the procedure specified in paragraphs (d)(1) and (d)(2) of this section.

(e) Any application for modification of authorization to extend a required date of completion, as set forth in § 25.133 for earth station authorizations or § 25.164 for space stations, or included as a condition of any earth station or space station authorization, must include a verified statement from the applicant:

(1) That states that the additional time is required due to unforeseeable circumstances beyond the applicant's control, describes these circumstances with specificity, and justifies the precise extension period requested; or

(2) That states there are unique and overriding public interest concerns that justify an extension, identifies these interests and justifies a precise extension period (f) An application for modification of a space station license to add an ancillary terrestrial component to an eligible satellite network will be treated as a request for a minor modification if the particulars of operations provided by the applicant comply with

the criteria specified in § 25.149. Notwithstanding the treatment of such an application as a minor modification, the Commission shall place any initial application for the modification of a space station license to add an ancillary terrestrial component on notice for public comment. Except as provided for in § 25.149(f), no application for authority to add an ancillary terrestrial component to an eligible satellite network shall be granted until the applicant has demonstrated actual compliance with the criteria specified in § 25.149(b).

(g) The licensee and grantees shall ensure compliance with the Commission's radio frequency exposure requirements in §§ 1.1307(b), 2.1091, and 2.1093 of this chapter, as appropriate. An Environmental Assessment may be required if RF radiation from the proposed facilities would, in combination with radiation from other sources, cause RF power density or field strength in an accessible area to exceed the applicable limits specified in § 1.1310 of this chapter. *See* § 1.1307(b)(5)(iii).

(h) Unless otherwise ordered by the Commission, an application for any of the following kinds of modification of the operation of a GSO space station will be deemed granted 35 days after the date of the public notice that the application has been accepted for filing, provided no objection is filed during the 30-day notice period and the application does not propose a change that would be inconsistent with a Commission rule or require modification of the BSS plan in Appendix 30 or the associated feeder-link Plan in Appendix 30A of the ITU Radio Regulations (both incorporated by reference, *see* § 25.108).

(1) Relocation of a DBS or GSO FSS space station by no more than 0.15° from the initially authorized orbital location, provided the application includes a signed certification that:

(i) The space station operator has assessed and limited the probability of the satellite becoming a source of debris as a result of collisions with large debris or other operational satellites at the new orbital location; and

(ii) The proposed station-keeping volume of the satellite following relocation will not overlap a station-keeping volume reasonably expected to be occupied by any other satellite, including those authorized by the Commission, applied for and pending before the Commission, or otherwise the subject of an ITU filing and either in orbit or progressing towards launch.

(2) Repositioning one or more antenna beams by no more than 0.3 angular degrees from a line between the space station and the initially authorized boresight location(s).

[56 FR 24016, May 28, 1991, as amended at 61 FR 9952, Mar. 12, 1996; 62 FR 5928, Feb. 10, 1997; 68 FR 33649, June 5, 2003; 68 FR 47858, Aug. 12, 2003; 68 FR 51503, Aug. 27, 2003; 68 FR 62248, Nov. 3, 2003; 68 FR 63998, Nov. 12, 2003; 69 FR 47794, Aug. 6, 2004; 70 FR 32253, June 2, 2005; 72 FR 60279, Oct. 24, 2007; 78 FR 8421, Feb. 6, 2013; 81 FR 55328, Aug. 18, 2016; 85 FR 18150, Apr. 1, 2020]

Issue: SpaceX has not met its 25.117 requirements as explained in extensive detail in the Opposition and the related AFR proceedings to show that its proposed modification is in the public interest. Is the SpaceX network as modified going to be able to refrain from impermissible operations? This includes and is not limited to:

(i) collisions, explosions, harmful interference to space-bound and earth-bound systems,

(ii) impermissible radio-frequency levels to humans, flora, fauna and the environment, and

(iii) impermissible light-pollution to humans, flora, fauna and the environment.

This is especially concerning due to the utter lack of reasonably documented compliance with basic requirements, such as a report on whether SpaceX is even insured against or provided a guarantee against catastrophic, systemic failure, or whether SpaceX has conducted necessary reviews for its seemingly limitless supply of wildly changing network configurations and modifications. Nor has SpaceX demonstrated that the vast number of satellites that it proposes to crowd into the orbital elevation plane just above 500 km: (i) have been actually and transparently tested in space to prove that they can avoid impermissible transmissions and that they can maneuver effectively and precisely enough to avoid collisions with other satellites or debris; and (ii) have been actually and transparently tested in space to prove

that the satellites can enter the earth's atmosphere as scheduled, and that they will sufficiently immolate and not rain down harmful debris.

Previously, SpaceX requested: "waiver of sections 25.202(a)(1), 25.202(g)(1), 25.157(e), 25.164(b), 25.208(e), 25.145(c), 25.146(i), and 25.146(a) of the Commission's rules, and conditional waiver of any restriction in Section 2.106 of the Commission's rules on SpaceX's proposed use of the 17.8-18.6 GHz band, and waiver of various limitations in the Commission's Form 312, Schedule S, in connection with this application."[8]

Issue: SpaceX has not demonstrated how the instant Major Modification continues to meet its prior-requested Part 25 waiver requirements, nor its Form 312 Schedule S requirements, especially given the newly revealed circumstances. As explained in extensive detail in the Opposition and the related AFR proceedings, there is a requirement to show that the proposed Major Modification is in the public interest. Is the SpaceX network as modified going to be able to refrain from impermissible operations? This includes and is not limited to:

(i) collisions, explosions, harmful interference to space-bound and earth-bound systems,

(ii) impermissible radio-frequency levels to humans, flora, fauna and the environment, and

(iii) impermissible light-pollution to humans, flora, fauna and the

[8] See FCC Public Notice, DA 17-524 (May 26, 2017) at p.3.

environment.

> This is especially concerning due to the utter lack of reasonably documented transparency and compliance with basic requirements, such as a report on whether SpaceX is even insured against or provided a guarantee against catastrophic, systemic failure, or whether SpaceX has conducted necessary reviews for its seemingly limitless supply of wildly changing network configurations and modifications.

2. SpaceX Reply pg. 2: "In fact, Balance fails to provide a cogent explanation of how the concerns asserted (or, more often, merely implied through a series of rhetorical questions) relate to the modification it is ostensibly opposing…"

BG Response: Incorrect. These concerns asserted by BALANCE GROUP in the Opposition and the related AFR are directly tied to SpaceX's Major Modification application; further, these concerns become stronger, not weaker, by SpaceX's proposal to drastically reduce elevation of 4,000+ satellites. SpaceX offers no evidence or actual space-born tests in support of its application that the environmental, health, collision, national security, interference risks will decrease, rather than increase. Again, SpaceX's arguments are conclusionary. In a matter of this gravity, SpaceX has the burden of proof, not the public.

3. SpaceX Reply pg. 2-3:

"Balance implies that SpaceX has failed to provide, and the Commission failed to consider, information relating to a wide range of issues purportedly implicated by the proposed modification. The areas noted include a varied list of topics, including: (NEPA), (orbital debris) (insurance), (peer reviewed studies) (astronomical research). [T]he Commission has fully considered each of these issues and resolved them, often in a way that obviates the need for individual satellite operators like SpaceX to provide further information in their applications.

"➢ National Environmental Protection Act ("NEPA"). The Commission has determined that actions on space station applications (including modifications) are deemed individually and cumulatively to have no significant effect on the quality of the human environment, and they are therefore categorically excluded from environmental processing."

BG Response: In fact, the Commission has not addressed these critical questions. To say "fully considered" is preposterous, as the Commission by its own admission lacks full competence on these matters. The Commission is not the nation's expert agency on human health or NEPA or insurance or a wide variety of other material matters related to this massive network, as proposed for Major Modification. To declare a categorical exemption, especially when there is no evidence the International Bureau even attempted to consult experts from other agencies, is by definition arbitrary and capricious.

4. SpaceX Reply pg. 3: ***Orbital debris mitigation.*** **"**The Commission has had clearly articulated rules on orbital debris since 2004 and just concluded a formal rulemaking proceeding in which it updated those rules after assessing comments from a large array of interested parties. SpaceX has provided extensive technical analysis to demonstrate that it meets or exceeds all adopted requirements and is an industry leader on space safety."

BG Response: What is SpaceX's detailed orbital debris Mitigation Plan and has the FCC commissioned independent experts to review and to assess it? Did SpaceX submit its orbital debris mitigation plan to the FCC before or after the Space Debris Order was finalized in April 2020? Has the SpaceX orbital debris Mitigation Plan been assessed by the Space Council? How is it good public policy to allow one company to fill the lower orbital elevations when there is so much debris

in the 200-300 km range left by other nations?

4. SpaceX Reply pg. 3: Insurance. "In its recent order on orbital debris, the Commission considered whether to impose an insurance requirement on space station licensees and declined to do so."

BG Response: Here again, SpaceX is misinterpreting the Commission as acting by fiat to define the very narrow Orbital Debris *Report & Order and Further Notice of Proposed Rulemaking* as covering a much longer list of foreseeable liabilities. That is probably not the case. As noted in the Opposition, such foreseeable liabilities concern catastrophic or systemic harms to aids to navigation, to terrestrial and spaceborne networks, to human health, to flora and fauna, to commercial and residential real-estate whose value proposition includes an untarnished dark sky, and variety of other material concerns. Yet SpaceX seems to evidence no concern, let alone making the required effort to reasonably and seriously study the foreseeable impacts of its network as proposed for Major Modification. Basic business practices require a liability analysis on these major points. SpaceX has provided no sufficient evidence to explain why no reasonably comprehensive insurance is required for the list of foreseeable catastrophic and systemic harms listed in the Opposition, and whose document production is requested in the accompanying Motions. SpaceX holds the burden to provide a reasoned and careful explanation, based on scientific evidence, to explain this apparent arbitrary position. Has *any* insurance carrier agreed to provide insurance against the reasonably foreseeable harms listed in the Opposition?

6. SpaceX Reply pg. 4: Radiofrequency exposure. **"**The Commission recently concluded a major review of its RF exposure rules in November 2019. It unanimously found that no changes were needed with respect to the NEPA exemptions in its rules, including the rules applicable to the space station application at issue here. In fact, directly contrary to Balance's assertions, the Commission considered input from other federal agencies in finding no credible evidence of a need for stricter rules."

BG Response: SpaceX has failed to produce a Radiation Hazard Report (RHR) to support its proposed Major Modification, let alone evidence an RHR for its underlying licenses, which now number almost 12,000 satellites. Also, the November 2019 RF exposure rules are under dispute and may not survive as currently structured. One reason is that Dr. Jeffrey E. Shuren's letter to the FCC dated April 24, 2019 is an opinion. It reportedly: (i) does not constitute formal FDA policy, and (ii) was not adequately reviewed as part of a formal FDA Rulemaking process

7. SpaceX Reply pg. 4: ***Radio astronomy "***The Commission has adopted several footnotes to the U.S. Table of Frequency Allocations (many developed by the International Telecommunications Union ("ITU") that address the need for satellite downlink transmissions to adequately protect the Radio Astronomy Service at specific sites in the United States. Compliance with these requirements is a condition of most satellite authorizations in the relevant bands; SpaceX completed that coordination over a year ago."

BG Response: Where is the evidence that the SpaceX network, as altered by the proposed Major Modification, will meet the requirements necessary to protect the Radio Astronomy Service? Where is the study by SpaceX submitted to the record for all interested parties to assess prior to any action by the FCC, as required by the APA? Has either the FCC or SpaceX adequately consulted with independent astronomical research associations, and addressed the material concerns raised in the Declaration by Stefano Gallozzi, which is incorporated in the BALANCE GROUP's AFR, cited and incorporated by reference in the Opposition? It appears that SpaceX has not adequately addressed those material issues.

8. SpaceX Reply pg. 5-7: "BALANCE MISAPPREHENDS THE REGULATORY PROCESS"

> "The Opposition vaguely invokes several statutes that it contends impose on the Commission "cross-agency and cross-government obligations….But as discussed below, it would appear from the listed statutes that Balance is suffering from a fundamental misapprehension as to the regulatory process applicable to satellite licensing processes generally and SpaceX's modification application specifically. In any event, the process affords federal agencies every opportunity to raise any concerns with applications being

considered by the Commission."

> "The Opposition seems to envision an alternative regulatory regime in which a federal licensing agency must affirmatively reach out to all other potentially interested agencies and even some private parties to solicit their input before resolving an application."

BG Response: The BALANCE GROUP placed on the record the basic standards required by NEPA and APA practice for major federal actions. Of course the proposed Major Modification, which seeks to radically alter the design of the largest satellite network in the history of mankind, is a major federal action. The BALANCE GROUP is not proposing, as alleged, an "alternative" process. It is the very process required by federal law. What is "exceptional" is the unsupportable proposition that the FCC and SpaceX are not bound by well-recognized federal practice. The numerous inter-agency and international treaty obligations to which this network as proposed for alternation by the Major Modification, are carefully outlined in the Opposition.

10. SpaceX Reply pg. 6**:** "Indeed, both NASA and the National Radio Astronomy Observatory commented on SpaceX's initial license application."

BG Response: The NASA and NRO comments cited by SpaceX clearly were filed prior to, and do not cover, the Major Modification application.

11. SpaceX Reply pg. 6: "SpaceX's progress in building and deploying its satellite network has garnered significant publicity, and the company has maintained active engagement with policy and regulatory stakeholders throughout the U.S. government… With all of the information already available, all stakeholders – including federal agencies, which are familiar with these processes – should be able to determine whether they have any concerns with SpaceX's plans."

BG Response: The ability to generate publicity does not equal a blanket exemption from having to comply with FCC rules. A private self-serving company cannot substitute its publicity and contacts with other federal agencies for the FCC's own obligations to consult carefully and obtain the expertise of other federal agencies and the public.

12. SpaceX Reply pg. 7: "BALANCE RAISES CONCERNS THAT FALL WELL OUTSIDE COMMISSION JURISDICTION

"The Communications Act directs the Commission to grant an application if it finds that doing so will serve the public interest, convenience, and necessity."

BG Response: BALANCE GROUP's entire Opposition details specific policies, cited in the AFR and incorporated by reference, including national security which SpaceX failed to address. A key point is that the impact on national security of the massive proposed low orbit modifications has not been examined. The national security implications are profound. SpaceX cannot cavalierly ignore grave concerns over national security raised by the Major Modification. SpaceX's seemingly limitless supply of wildly changing network configurations and modifications causes major concern. SpaceX has failed to demonstrate that the vast number of satellites that it proposes to crowd into the orbital elevation plane just above 500 km: (i) have been actually and transparently tested in space to prove that they can avoid impermissible transmissions and that they can maneuver effectively and precisely enough to avoid collisions with other satellites or debris; and (ii) have been actually and transparently tested in space to prove that the satellites can enter the earth's atmosphere as scheduled, and that they will sufficiently immolate and not rain down harmful debris.

13. SpaceX Reply pg. 8: "Instead, the Opposition raises a series of questions and concerns that it seems to think would bear upon some aspect of the public interest. But Congress did not grant government agencies a limitless field of review."

BG Response: The SpaceX Major Modification application cannot be used to circumvent important responsibilities imposed by federal statutes. Failing to list the requirements that government agencies of jurisdiction must rule upon prior to this Major Modification being legally granted will not work. Similarly, pushing the FCC to incur for the United States potential legal liabilities under

by arbitrarily and capriciously granting the SpaceX Major Modification could implicate the Outer Space Liability Convention, among other major obligations. The FCC cannot avoid this liability, nor shield the U.S. from actions brought by injured parties in other countries, by brushing off these concerns with the statement that it is only a regulatory agency and lacks statutory authority.

14. SpaceX Reply pg. 8: "As the Supreme Court has recognized, though afforded wide latitude in its supervision over communication by wire and radio, 'the Commission was not delegated unrestrained authority' and the public-interest standard 'is not to be interpreted as setting up a standard so indefinite as to confer an unlimited power.' In other words, the Commission is not authorized to engage in an entirely open-ended review of any issues untethered to the agency's core mission."

BG Response: The "core mission" of the FCC is to effectuate a reasonable balance between the public interest (which includes, and is not limited to, the public concerns over health, environment, satellite collisions, debris, and national security) and the interests of the telecommunications industry. The core mission of the FCC involves recognizing when it is being asked to approve a massive proposed alteration to the largest satellite network in human history, and to not fail to adequately notice other agencies whose jurisdiction is implicated. The FCC must consult with its peer agencies, and must meet its designated roles under various treaties, prior to any grant of the Major Modification. The FCC cannot act as a self-proclaimed "supra-constitutional agency," above treaty obligations and the law, beholden only to itself and the commercial interests it believes it is obligated primarily to serve. SpaceX should recognize that no specific provision permits the FCC uncontrolled exploitation of space and endangerment and infringement of rights of countries and their citizens around the world.

16. SpaceX Reply pg. 9: "These are all undoubtedly important topics in general. But their significance alone does not place them within the jurisdiction or expertise of the Commission…"

BG Response: SpaceX here concedes that the FCC has no competence to decide these issues implicated by the Major Modification on its own.

17. SpaceX Reply pg. 9: "[The] Commission [was asked] to order a halt to construction of the Sears Tower because of the "multiple ghost images" it would create for many viewers in the Chicago area. Although the complainants claimed that the Commission had authority over anything that could "substantially affect communications," the Commission dismissed the complaint as falling outside its jurisdiction, and the court affirmed."

BG Response: Comparing Petitioners' request for a careful assessment of insurance, national security, environmental and health effects by the disparaging comparison with "ghost images" only reveals the vulnerability in SpaceX's argument.

18. SpaceX Reply pg. 10: "Although the Opposition purports to raise questions about the proposed modification of SpaceX's NGSO system, it is really a much broader attack on the Commission's policies in general, including those underlying reviews of proposed satellite systems like the initial SpaceX application."

BG Response: SpaceX filed the application. Petitioners addressed the "come along" rule in the AFR and in their Reply. It is accepted FCC policy to address matters that SpaceX itself raised by filing the Major Modification in the context of a specific Opposition and related Motions. These issues are, indeed, entwined, and not ignorable.

19. SpaceX Reply pg. 11: "At this point, even if Balance posed legitimate questions (which it does not), it would be too late to relitigate in this proceeding matters that the Commission resolved long ago."

BG Response: Under this reasoning SpaceX has carte blanche to do anything and everything it wishes, and the public has no rights at all, ever, to challenge a massive and controversial proposed change to the largest satellite network in human history. The issues raised must be addressed prior to any FCC decision.

III. CONCLUSION

Overall, the SpaceX Response, like in its Major Modification application, presents of *prima facie* case of misunderstanding the facts, misstating the facts, not comprehending the proceedings at issue, and most importantly, showing that they are presently incapable of showing the FCC or the public that they have a reasonably well-formed, let alone safe, modification plan in compliance with 47 CFR, Part 1 & Part 25.

It is humbly requested that the Motions requested by the BALANCE GROUP be granted, or the SpaceX Major Modification be denied.

Respectfully submitted,
THE BALANCE GROUP

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CERTIFICATE OF SERVICE

I hereby certify that, on this 15th day of June, 2020, a copy of the foregoing pleading was served via electronic mail upon:

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